CLAIMS

1. An apparatus for chemical mechanical planarization (CMP), comprising:

at least one frame;

a polishing membrane attached to the at least one frame; and

a pad support disposed below the polishing membrane, the pad support capable of differentially flexing the polishing membrane.

2. An apparatus as recited in claim 1, wherein the at least one frame has an essentially round shape.

3. An apparatus as recited in claim 1, wherein the pad support provides non-contact reactive force to the polishing pad during a CMP process.

4. An apparatus as recited in claim 3, wherein the pad support is an air bearing that provides air pressure to the polishing membrane.

5. An apparatus as recited in claim 3, wherein the pad support provides fluid pressure to the polishing membrane.

6. An apparatus as recited in claim 1, wherein the pad support is in contact with the polishing membrane.

7. An apparatus as recited in claim 6, wherein the pad support includes mechanical elements capable of differentially flexing the polishing membrane during a CMP process.

8. An apparatus as recited in claim 1, further comprising a conditioner element disposed above the polishing membrane, wherein the conditioner element is capable of eroding the polishing membrane.

9. An apparatus as recited in claim 8, further comprising a conditioner pad support disposed below the polishing membrane and the conditioner element.

10. A method for planarizing a wafer surface during a chemical mechanical planarization (CMP) process, comprising the operations of:

positioning a pad support below a polishing membrane attached to at least one frame;

rotating the at least one frame; and

applying downward force to a wafer disposed above the polishing membrane and the pad support, wherein the pad support differentially flexes the polishing membrane while providing reactive force to the polishing pad during a CMP process.

11. A method as recited in claim 10, wherein the at least one frame has an essentially round shape.

12. A method as recited in claim 10, wherein the at least one frame has an essentially cylindrical shape.

13. A method as recited in claim 10, wherein the pad support is an air bearing that provides air pressure to the polishing membrane.

14. A method as recited in claim 10, wherein the pad support is in contact with the polishing membrane.

15. A method as recited in claim 14, wherein the pad support includes mechanical elements capable of differentially flexing the polishing membrane during a CMP process.

16. A method as recited in claim 10, further comprising the operation of eroding the polishing membrane during the CMP process using a conditioner element.

17. An apparatus for chemical mechanical planarization (CMP), comprising:

a cylindrical frame;

a polishing membrane attached to an end of the cylindrical frame; and

a pad support disposed within the cylindrical frame and below the polishing membrane, the pad support capable of differentially flexing the polishing membrane.

18. An apparatus as recited in claim 17, wherein the pad support is an air bearing that provides air pressure to the polishing membrane to differentially flex the polishing membrane during a CMP process.

19. An apparatus as recited in claim 17, wherein the pad support is in contact with the polishing membrane, and wherein the pad support includes mechanical elements capable of differentially flexing the polishing membrane during a CMP process.

20. An apparatus as recited in claim 17, further comprising:

a conditioner element disposed above the polishing membrane; and

a conditioner pad support disposed below the polishing membrane and the conditioner element, wherein the conditioner element is capable of eroding the polishing membrane.